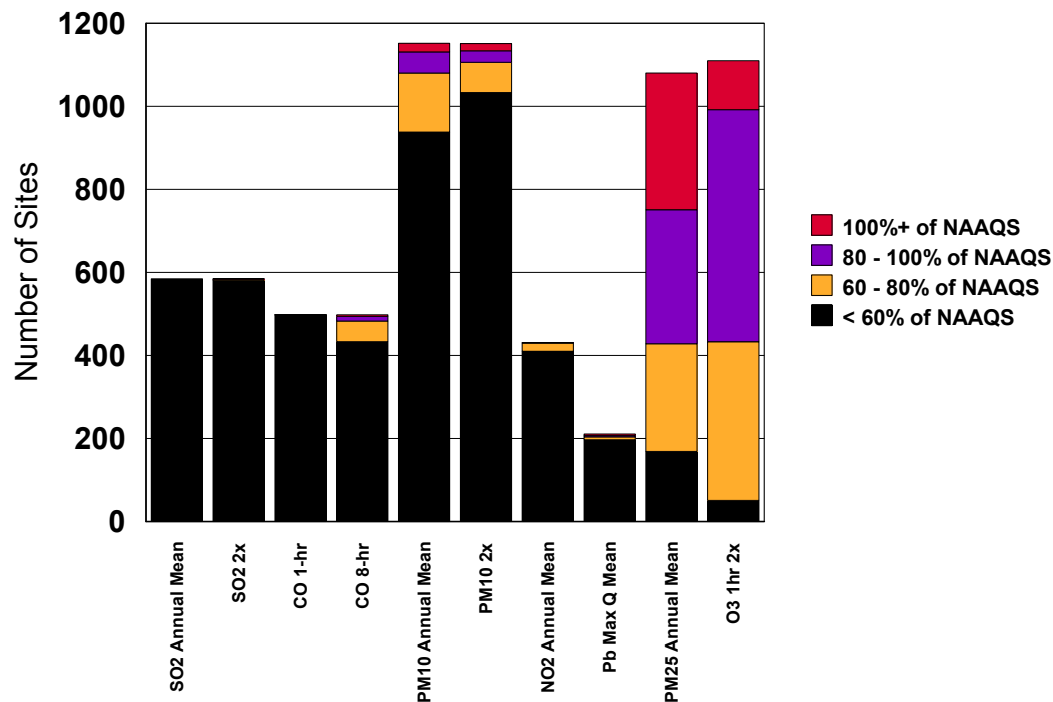


Parts 53 and 58 Revisions to Ambient Air Monitoring Regulations

Presentation to the
South Carolina Department of Health and Environmental Control
March 1, 2006
By: Tim Hanley
EPA – Office of Air Quality Planning and Standards

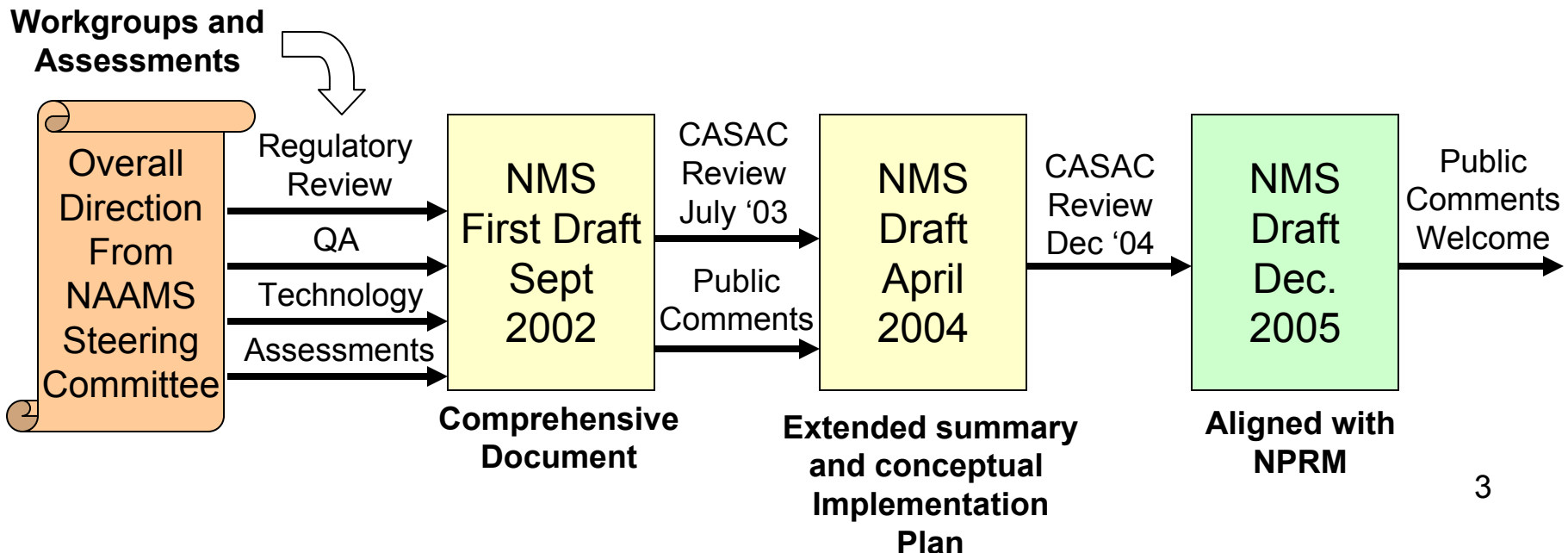
What is the National Ambient Air Monitoring Strategy?

- The strategy is an explicit effort to lay down a multiple pollutant measurement infrastructure to drive and support integrated air program management.
- The strategy shifts the nations networks from being a “compliance” dominated orientation toward greater support of public reporting, program accountability, and scientific needs.
- The overall approach and concepts have been endorsed by EPA’s Science Advisory Board and recognized the National Academy of Sciences in their Reports on Air Quality Management and Particulate Matter.



National Ambient Air Monitoring Strategy Document

- Updated in December 2005 for consistency with proposed monitoring rule.
 - <http://www.epa.gov/ttn/amtic/monstratdoc.html>
- Developed through a stakeholder driven process over the last 5 years by EPA and State/local/Tribal Air Monitoring Agencies
- Review and input from CASAC Ambient Air Methods and Monitoring Subcommittee and former CASAC Subcommittee on the NAAMS



Notice of Proposed Rulemaking (NPRM) Schedule

- Signed by EPA Administrator on December 20, 2005
- Published in the Federal Register on January 17, 2006
 - <http://www.epa.gov/ttn/amtic/40cfr53.html>
- Public hearings held on March 8, 2006
- Public Comment period through April 17, 2006

Public comments must be made through web site, E-mail, Fax, Mail, or hand delivered **according to instructions in proposed rule**.
Discussions or comments made here are not part of that process unless submitted according to instructions in the proposed rule.

- Expect Final Rulemaking by September 27, 2006

PM NAAQS Parts 53 and 58 Monitoring Proposal

The monitoring proposal has two major elements:

- Revisions to monitoring and method approvals that support the PM NAAQS – including development of a PM_{10-2.5} monitoring program
- Changes in the Ambient Air Monitoring program according to the National Ambient Air Monitoring Strategy (NAAMS)

How do the PM NAAQS and Ambient Air Monitoring Packages fit together?

PM NAAQS and Ambient Air Monitoring Proposed Rules

PM NAAQS NPRM

Part 50 – National Primary and Secondary Ambient Air Quality Standards

Includes:
PM NAAQS

PM_{2.5} Primary and Secondary
PM_{10-2.5} Primary and Secondary
Revocation of PM₁₀ in most of U.S.

PM_{2.5} FRM
PM_{10-2.5} FRM

Interpretation of NAAQS for PM_{2.5}
Interpretation of NAAQS for PM_{10-2.5}

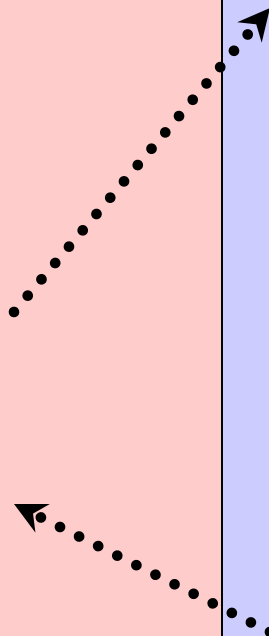
Monitoring NPRM

Part 53 – Ambient Air Monitoring Reference and Equivalent Methods

Includes:
Approval of FRMs and FEMs
PM_{2.5}
PM_{10-2.5}

Part 58 – Ambient Air Quality Surveillance

Includes:
Network Description
Periodic Assessments
Operating Schedule
Data Certification
Special Purpose Monitoring
Quality Assurance
Methodology
Network Design
Probe and Siting Criteria



40 CFR Part 50

National Ambient Air Quality Standards
for Particulate Matter; Proposed Rule -
PM Federal Reference Methods

PM_{2.5} Federal Reference Method (FRM)

- **High precision, well performing method**
- Minor changes proposed to the PM_{2.5} FRM that are already part of routine operation through equivalent method use or national user modifications:
 1. Adopt the **Very Sharp Cut Cyclone (VSCC)** as an approved second stage separator for PM_{2.5}. This would be in addition to the WINS
 2. Use of **Diethyl Sebacate (DOS)** oil as an alternative oil in the WINS
 3. Extend **filter recovery extension time**; 96 hours → **177 hours** (7 days, 9 hours)

VSCC

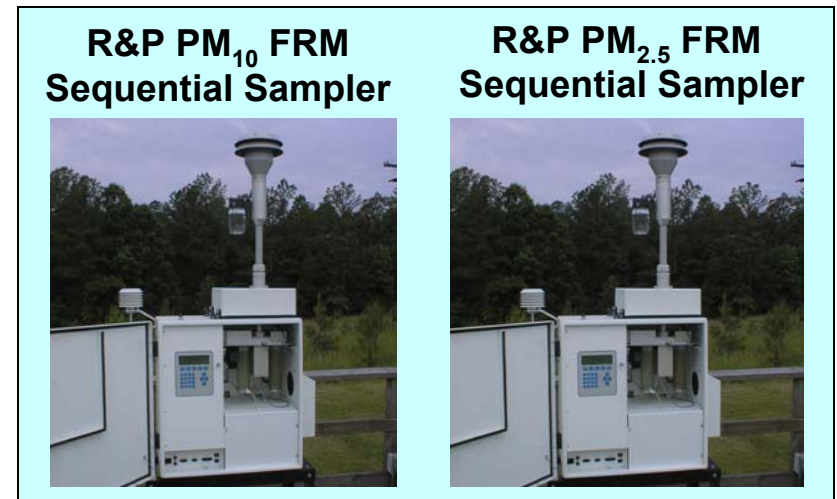
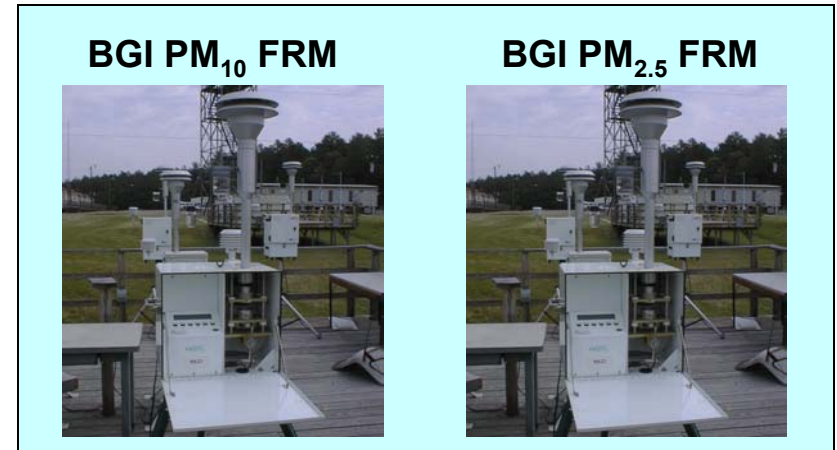


	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Sample Days									
Current Recovery Period									
Proposed Recovery Period									

- Additional modification proposed based on experiences gained with PM_{2.5} FRM and chemical speciation program
 4. Modify filter transport temperature and post-sampling time requirements for final laboratory analysis; **filter transport temperature maintained at or below average ambient temperature during sampling** allows up to 30 days for post sampling conditioning and weighing.

Proposed PM_{10-2.5} FRM

- Two concurrently operated low-volume samplers with one measuring PM₁₀ and the other PM_{2.5}
- Peer Reviewed by Clean Air Scientific Advisory Committee (CASAC)
 - Consensus support for PM_{10-2.5} difference method as the most appropriate choice for an FRM to:
 - Approve continuous FEMs for use in the actual network
 - Quality assurance of network (via collocation)
 - Several strengths and weaknesses noted
 - Support for dichotomous method as possible alternative FRM, pending resolution of issues
 - Support for continuous Federal Equivalent Methods as primary method for use in network.



Peer review report available at:
http://www.epa.gov/sab/pdf/casac_06001.pdf

$$PM_{10} - PM_{2.5} = PM_{10-2.5} \quad 9$$

40 CFR Parts 53 & 58

Revisions to Ambient Air Monitoring
Regulations; Proposed Rule

Part 53 - Major Components

- Approval of reference and equivalent methods
- New performance based criteria for $PM_{2.5}$ and $PM_{10-2.5}$ equivalent methods

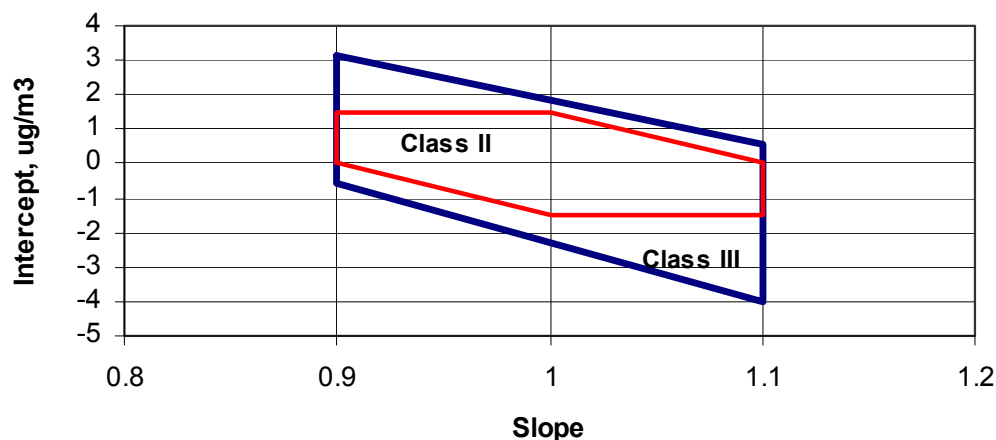
Approval of Reference and Equivalent Methods

- $PM_{10-2.5}$ FRM
 - PM_{10} and $PM_{2.5}$ low-volume FRMs that are the same make and model
- Federal Equivalent Method's for both $PM_{2.5}$ and $PM_{10-2.5}$
 - Three classes of equivalent methods ranging from method with minor deviations from the FRM as Class I to continuous methods as Class III
 - A filter-based dichotomous method would be categorized as a Class II method
- Proposed Testing for both $PM_{2.5}$ and $PM_{10-2.5}$
 - Class II - at two sites from list below, one east and one west in one season each
 - Class III – at three sites (two seasons at test sites A & B, winter season only at test site C)
 - Solicit comment on a possible fourth site
- Test Sites
 - Site A – Los Angeles basin - characterized by high nitrates and semi-volatile organic pollutants
 - Site B – Northeastern to Mid-Atlantic – characterized by high sulfate, high relative humidity and wintertime conditions
 - Site C – Higher elevation Western U.S. city – characterized by cold weather, winds and dust.

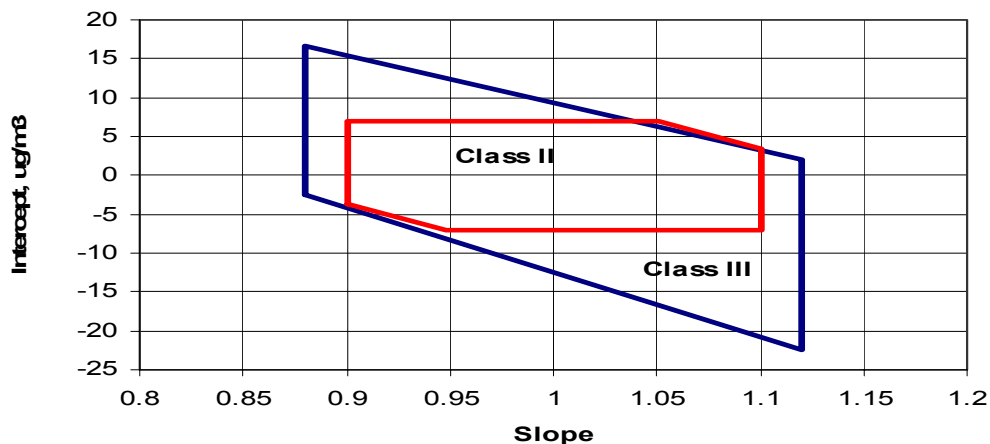
PM Federal Equivalent Methods

- New performance criteria are proposed
 - Based on Data Quality Objective Process
 - Considers tradeoffs between several inputs
 - Advantage of continuous methods (Class III) in this process is that they provide higher sample frequency and completeness
 - Criteria
 - Linear regression slope and intercept as illustrated
 - Sampler precision
 - 10% for $PM_{2.5}$ Class II
 - 15% for $PM_{2.5}$ Class III and $PM_{10-2.5}$ Class II and III
 - Correlation, >0.93 or >0.95 based on sample population

Acceptance Limits for Slope and Intercept for $PM_{2.5}$ Methods



Acceptance Limits for Slope and Intercept for $PM_{10-2.5}$ Methods



Part 58 – Major Components

- Network Plans and Assessments
- Updated Special Purpose Monitoring (SPM) provisions
- Network minimums go away for CO, SO₂, NO₂, and PM₁₀
- Revised network minimums for Pb
- Revised network minimums for O₃ and PM_{2.5} based on population and design value
- Introduction of NCore multi-pollutant sites
- New monitoring network for PM_{10-2.5}
- AQS data submittal and certification
- Revisions to QA program
- Incentives for “Approved Regional Methods” for PM_{2.5}
- PAMS monitoring program

Network Plans and Assessments

- Annual Monitoring Network Plans
 - Basically same as current practice; however, allow opportunity for public comment and formalize approval.
 - First one due July 1, 2007
 - “...must be made available for public inspection at least 30 days prior to submission to EPA.”
 - Approved by the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove within 120 days
- Air Quality Assessments every five years
 - Comprehensive in scope
 - First one due July 1, 2009
 - Guidance forthcoming

Special Purpose Monitors (SPM)

- What is it/isn't it?
 - Site can be used for up to 24 months without being compared to NAAQS, (except may be used for existing NAAQS when States request an existing non-attainment area be designated to attainment)
 - Designated in annual network plan and AQS
 - Cannot be a monitor used to meet the minimum monitoring requirements
 - Cannot be an existing SLAMS monitor
- What applies to it?
 - All NAAQS pollutants
 - QA and methods apply for FRM/FEM/ARM
 - Flexibility for network design, and probe and siting criteria
 - Data submitted to AQS for FRM/FEM/ARM
- Other
 - No prior approval needed to shut down an SPM

Areas of Divestment:

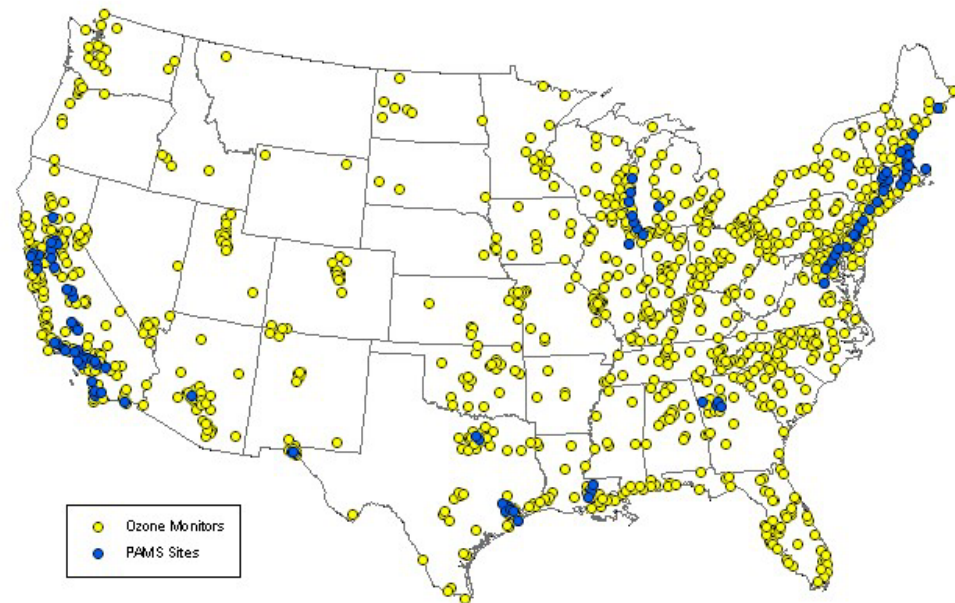
CO, SO₂, NO₂, PM₁₀, Pb

- Generally, for all of these pollutants the EPA Region can approve the shutdown of a monitor as part of the annual network review
 - See 58.14 for specific provisions on discontinuing monitors
- No minimums apply for CO, SO₂, NO₂
- PM₁₀ - No requirement for continuation in any area where the PM₁₀ NAAQS would be revoked
- Pb – required in areas where levels are still a concern
 - 2 sites required in areas above the NAAQS
 - 1 maximum exposure site
 - 10 Pb sites at NCore or urban air toxics sites for long-term trends; one per Region in most populated MSA/CSA

Ozone Monitoring Program

- Network minimums proposed to be based on combination of:
 - Population of an area
 - Design value
- **Overall, expect about the same number of ozone sites, although some may move for better spatial coverage**

Ozone Monitoring Network



Ozone Monitoring Program

MSA or CSA¹ Population	Design Value \geq 115% of any O₃ NAAQS	Design Value +/- 15% of any O₃ NAAQS	Design Value \leq 85% of O₃ NAAQS²
$\geq 10\text{M}$	3	4	2
4-10M	2	3	1
1M - 4M	2	2	1
350K – 1M	2	2	1
200K – 350K	1	1	0
50K – 200K	1	1	0

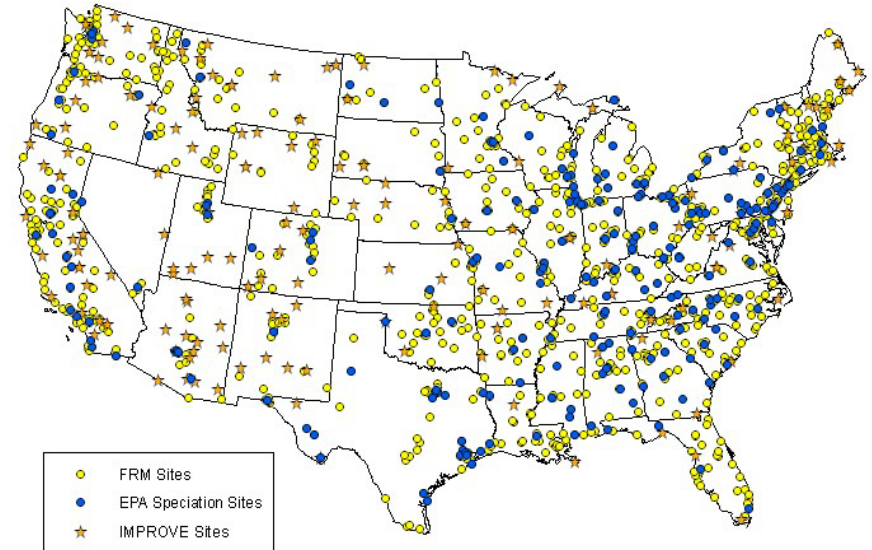
1 – Requirements apply to CSA, if available

2 – These minimum monitoring requirements apply in the absence of a design value

PM_{2.5} Monitoring Program

- Network minimums proposed to be based on combination of:
 - Population of an area
 - Design value
- Continuous PM_{2.5} monitors required at one half (round up) the sites identified above
- Background and transport sites still apply for each State
- Speciation Trends Network required (~54 sites)
- **Overall, expect most FRM/FEM sites to continue; however, some redundant urban sites to be eliminated**

PM_{2.5} Monitoring
(peak network operation)



PM_{2.5} Monitoring Program

Minimum Required FRM/FEMs

MSA or CSA ¹ Population	Design Value ≥ 115% of any PM _{2.5} NAAQS	Design Value +/- 15% of PM _{2.5} NAAQS	Design Value ≤ 85% of any PM _{2.5} NAAQS
>1M	2	3	2
500K – 1M	1	2	1
250K – 500K	1	1	0
100K – 250K	1	1	0
50K – 100K	1	1	0

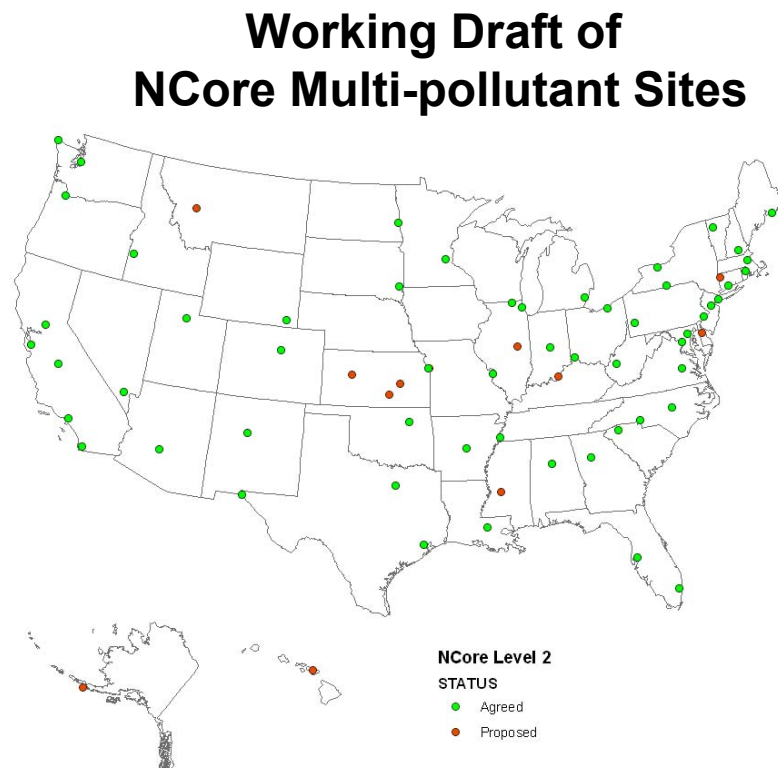
1 – Minimums apply to CSA, where applicable

- Continuous PM_{2.5} monitors required at one half (round up) the sites identified above
- Background and transport sites still apply for each State
- Speciation Trends Network required in addition to table above

Area of Investment:

National Core (NCore) Multi-pollutant Sites

- NCore Multi-Pollutant Network
 - Pilot network ramping up now
 - Network plans due July 1, 2009
 - Full network operational by January 1, 2011
 - ~75 Sites Nationally
 - ~55 Urban Sites at Neighborhood to Urban Scale
 - ~20 Rural Sites at Regional Scale
 - 1-3 sites per State
- Pollutants
 - Particles
 - $PM_{2.5}$ filter-based and continuous, speciated $PM_{2.5}$, continuous $PM_{10-2.5}$
 - Gases
 - O_3 ; high-sensitivity - CO, SO_2 , NO/ NO_y
 - Meteorology
 - Amb. Temp, WS, WD, RH
 - Long-term plan to include
 - NH_3
 - HNO_3



Area of Investment: PM_{10-2.5} Monitoring Program

- PM_{10-2.5} Network
 - Network Plan
 - Due January 1, 2008
 - Can be extended to July 1, 2008
 - Implementation by January 1, 2009
 - Methods
 - Daily PM₁₀ methods can be used to demonstrate attainment through 12/31/2012 – subject to network design criteria
 - Planning for continuous FEMs as primary method in network to best support daily NAAQS

PM_{10-2.5} Network Sizing and Siting

- Minimum PM_{10-2.5} monitoring requirements based on MSA population (at least 100,000) and estimated design value. Zero to five required sites per MSA.
 - Approximately 228 monitors required in 150 MSAs based on 2002-2004 estimated design values and proposed PM_{10-2.5} daily NAAQS of 70 ug/m³.
- Required sites must meet five part suitability test for comparison to NAAQS and to insure consistency with qualified PM_{10-2.5} indicator.
 - Within boundaries of urbanized area $\geq 100,000$.
 - Must be in census block group of population density ≥ 500 people per square mile (or within enclave of < 5 square miles area if population density < 500).
 - Must be population-oriented.
 - May not be in a source-influenced microenvironment such as a microscale or localized hot spot location.
 - PM_{10-2.5} concentrations at the site must be dominated by re-suspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, and must not be dominated by rural windblown dust and soils and PM generated by agricultural and mining sources, as determined by the State (and approved by the Regional Administrator) in a site-specific assessment.

PM_{10-2.5} Network Sizing and Siting - *continued*

- Placement of required monitors relative to sources.
 - Minimum of 50 percent of required monitors must characterize middle-scale sized areas (100 meters to 500 meters across). Situated in areas of expected maximum concentration from emissions from industrial sources and/or heavily traveled roadways.
 - Additional required monitors placed in middle-scale or neighborhood scale sized areas (500 meters to 4 kilometers across). Areas with high population density and some exposure to emissions from industrial sources and/or heavily traveled roadways.
 - One discretionary monitor may be placed in suburban-type residential areas in MSA's with four or five required monitors.
- Additional features.
 - Required PM_{10-2.5} speciation sites in MSA's of population > 500,000 with estimated design values > 80 percent of proposed NAAQS. Approximately 25 sites will be required based on these criteria. EPA envisions approximately 50-100 speciation sites at a nationally diverse set of urban and rural locations.
 - EPA support for non-required rural PM_{10-2.5} mass concentration sites to assess differences between areas dominated by wind blown crustal materials and by urban enriched coarse particles.
- NPRM solicits comment of many aspects of PM_{10-2.5} network design.
 - For example, how to handle sites that do not meet five part suitability test, but have the potential for ambient mixes of coarse particles of the type intended to be included in the indicator.

Proposal for Minimum Required PM_{10-2.5} Network (Total Sites = 228)

MSA Population	High ≥ 80% of NAAQS (56 µg/m ³)	Moderate 50 to 80% of NAAQS (35 to 56 µg/m ³) or unknown	Low < 50% of NAAQS (35 µg/m ³)
≥5M	5	3	2
1M - <5M	4	2	1
500k – <1M	3	1	0
100k - <500k	2	1	0

•The minimum requirements of this table only apply to MSAs that contain all or part of an urbanized area with a population of at least 100,000 persons. Multiple MSAs in a CSA are separately subject to these requirements based on their population and design value.

•More populated areas get more monitors.

•Areas with higher estimated PM_{10-2.5} design values get more monitors.

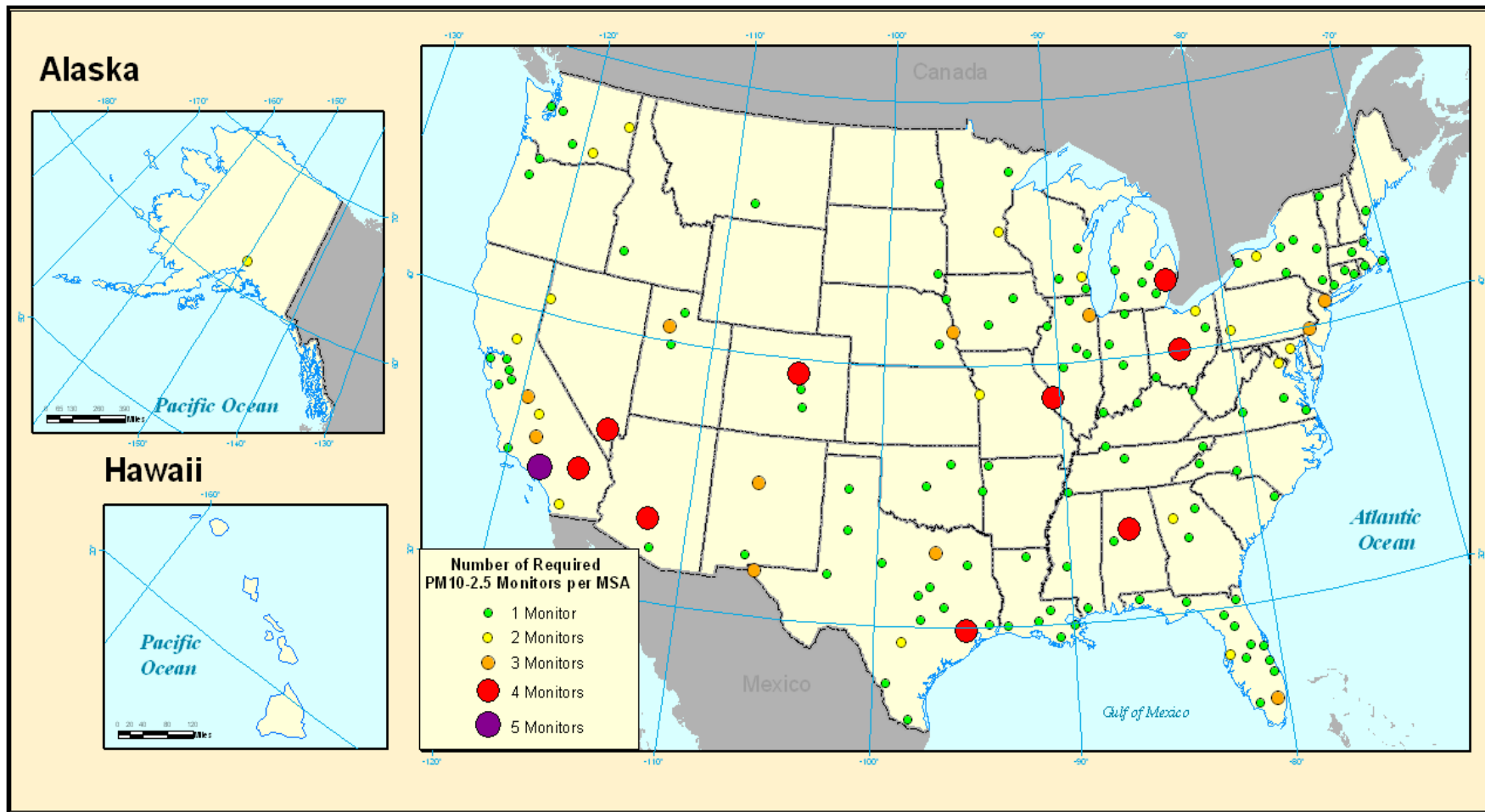


Illustration of PM_{10-2.5} monitors that could be required by the proposed requirements in the monitoring NPRM. The circles, which are sized to indicate the number of required monitors, appear at the centroid of MSAs and do not imply the actual placement of any of the required monitors at particular locations within the MSA.

Ambient Air Monitoring Rule and Communications

- **Proposed Rules, Fact Sheets, How to Comment**
 - <http://www.epa.gov/air/particles/actions.html>
- **AMTIC – Ambient Monitoring Technology Information Center** – details on ambient air monitoring programs, methods, and supporting materials
 - <http://www.epa.gov/ttn/amtic/>

Background Slides

AQS Data Submittal and Certification

- Includes
 - SLAMS
 - NCore, PAMS, and all other routine stations
 - SPMs using FRM/FEM/ARMs
- Data Reporting
 - Quarterly data reporting remains the same – within 90 days past the end of the quarter
 - Pollutant Data - SO₂, CO, O₃, NO₂, NO, NO_y, Pb, PM₁₀, PM_{2.5}, PM_{10-2.5}, chemical speciation
 - Other information - PM_{2.5} sampler-generated Temp, BP, and **field blank mass for filter based FRM/FEMs**
 - Met Data - NCore multi-pollutant sites and PAMS
 - 6-month Data Reporting – past the end of the quarter
 - VOC, and if collected, carbonyl, NH₃, and HNO₃
- Certification
 - Propose to move up certification date from July 1 to May 1, starting in 2009.

Revisions to the Quality Assurance Program

- Ensure regs reflect current EPA QA Policy and requirements
 - QAPP/QMP, QA Manager (Lead), Graded Approach
- Combined Appendix A and B (PSD)
- DQOs for PM_{10-2.5} and O₃ identified
 - As before, DQOs are goals to inform when to take action for improvement, not to invalidate
- Removed out of date QA methods
 - SO₂/NO₂ Manual Audit Checks
- Revised Performance Evaluation Language of PEP and NPAP
 - Monitoring org responsibility but allows for continued Federal implementation
- Expanded audit concentration levels to account for precursor gas monitoring
- Reduced burden where experience has shown that we could
 - PEP Reduction
 - PM Collocation Reduction (number of sites & sampling frequency)
- Changed Statistics (forms and levels of aggregation)
 - Confidence limits at the site level for gaseous pollutants

Approved Regional Methods (ARMs) for PM_{2.5}

- PM_{2.5} continuous method approved for use within a State, local, or Tribal agency used to meet multiple monitoring objectives such as NAAQS, AQI...
- Would allow S/L/T to optimize their PM_{2.5} network with well performing continuous methods
- Testing Criteria
 - Uses same performance criteria as Class III methods; however, flexibility to demonstrate sample precision
 - Testing occurs at subset of sites in network within which it's intended to be used

PAMS Monitoring Program

Measurement	Minimum Required
Speciated VOC	Two sites per area, with one being a Type 2
Carbonyl Sampling	Type 2 site in serious or above areas for the 8-hour
NO _x	All type 2 sites
NO _y	One site per area at the Type 1 or 3 site
CO (ppb level)	One per area at the Type 2 site
Ozone	All PAMS sites
Surface Met	All PAMS Sites
Upper Air Met	One representative location per PAMS area

- Currently 109 stations in 25 Ozone non-attainment areas
- Represents a reduction to about half the existing requirements
- Allows PAMS programs to be more customized to local data needs
 - Recommend keeping Air toxics data users in mind if there are any reductions